

Apollo Schedule Plans 11 Missions in 2 Years

NASA has announced an Apollo mission schedule of six flights in 1968 and five in 1969.

NASA Associate Administrator for Manned Space Flight, Dr. George Mueller, said the new schedule and alternative plans provide a schedule under which a limited number of Apollo Command and Service Modules and Lunar Landing Modules configured for lunar landing may be launched on test flights toward the Moon by the end of the decade.

In the revised Apollo schedule, Command, Service and Lunar Modules will be tested and qualified on concurrent unmanned flights of the Uprated Saturn and Saturn V launch vehicles. (Apollo/Uprated Saturn flights are identified with a two-hundred series number, i.e., Apollo/Saturn 204. Saturn V flights are identified with a five-hundred series number, i.e., Apollo/Saturn 502.)

The schedule for 1968 includes:

Apollo/Saturn 204, the first unmanned test of the Lunar Module in earth orbit.

Apollo/Saturn 502, second unmanned flight test of the Saturn V launch vehicle and Apollo Command and Service Module.

Apollo/Saturn 503, third unmanned test of the Saturn V and Command and Service Module.

Apollo/Saturn 206, second unmanned flight test of the Lunar Module in earth orbit.

Apollo/Saturn 205, first Apollo manned flight, a 10-day mission qualifying the Command and Service Modules for further manned operations.

Apollo/Saturn 504, first manned Apollo flight on the Saturn V launch vehicle. This mission will provide the first manned operation in space with both the Command and Service

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AIAA Sponsors 3-Day Astrodynamics Meeting

The Houston Section of the American Institute of Aeronautics and Astronautics will sponsor a three-day astrodynamics conference at MSC December 12-14.

Slanted toward presenting developments in astrodynamics now being applied in the nation's manned spaceflight program, the conference will emphasize information that has not been generally published, according to AIAA Section Chairman Aleck C. Bond, MSC Mission Planning and Analysis Chief John P. Mayer is conference chairman and Flight Analysis Branch Chief Claiborne R. Hicks, Jr. is conference program chairman.

MSC and industry people engaged in astrodynamics research studies will present 34 papers in five major areas of the field.

The conference, held in the Building 1 Auditorium starting at 8 am December 12, is open to all interested MSC employees provided they clear their attendance with their supervisors. Pre-registration cards may be obtained from Mary Ann Goodwin/FM16, Ext 2889, or from Dr. Paul Penzo, TRW Systems, HU 8-3530 Ext 2459.

Opening session welcome addresses will be made by Bond, Mayer and MSC Director of Flight Operations Christopher C. Kraft, Jr.

The December 12 morning session, Celestial Mechanics and Optimization, chaired by Jack Funk of MSC, will include the following papers:

Impulsive Orbit Transfer by an Accelerated Gradient Method, I. L. Johnson, MSC. *Rocket Trajectory Optimization by a Second Order Numerical Technique*, by H. J. Kelly of Analytical Associates, Westbury, N.Y., and B. R. Uzzell and S. S. McKay, MSC. *An Empirical Simulation Method of Restricted State Trajectory Cal-*

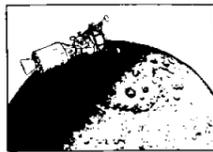
ulation, by F. Johnson, Jr., MSC. *Analytic Ephemeris Generation*, by E. J. Kenyon, MSC. *A Practical Technique for Computing Optimum N-Impulse Rendezvous Trajectories Using Primer Vector Theory*, by D. J. Jezewski, MSC. *An Iteration Technique Using Matched Conics to Converge Precision Trajectories to Specific Boundary Conditions*, by E. W. Henry, MSC.

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ROUNDUP

NASA MANNED SPACECRAFT CENTER

HOUSTON, TEXAS



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NEW BREED—The first flight version of Saturn V lifts off Kennedy Space Center Launch Complex 39 to place into orbit the Apollo IV spacecraft in an unmanned test of the unflown first and second stages and of the spacecraft heatshield at lunar return velocities. The roar of the S-IC during launch was estimated to be the loudest non-nuclear noise ever produced by man.

HEAVIEST PAYLOAD YET—

Apollo IV/Saturn V Flight Called Textbook Mission

Near-perfect functioning of three launch vehicle stages, placing into orbit a record payload of 140 tons and reentry of an Apollo Command Module

at lunar return velocities all added up to what has been characterized as a textbook mission in the November 9 flight of Apollo IV.

The Saturn V S-IC first stage and S-II second stage performed as planned on their maiden flight. The S-IVB third stage had flown four times earlier as the second stage of the Uprated Saturn I.

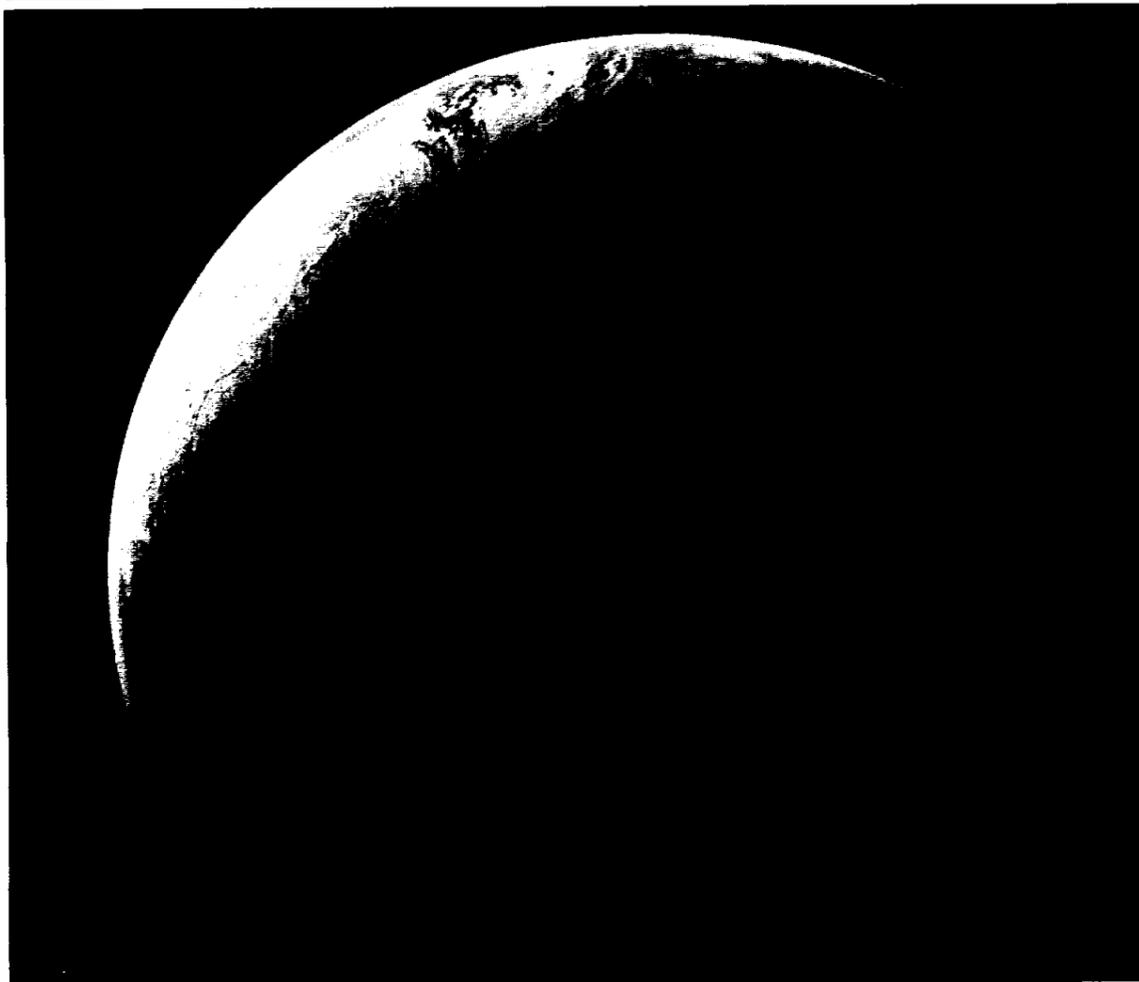
Commenting on Apollo IV mission results at a postflight press conference, NASA Deputy Administrator Dr. Robert C. Seamans said, "Today we placed in earth orbit over 280,000 pounds. To give this some perspective, this is three times the weight of the six manned Mercury spacecraft and the ten manned Gemini spacecraft that we have flown."

"And I believe," Seamans continued, "that this is a clear indication that our team of government, industry and university people was not found wanting, and that we do have the capacity in this country to be preeminent not only in space, but in all human endeavor involving science and technology. The power of the Saturn V is exceeded many-fold by our power in this country to accomplish the near impossible for the good of all mankind."

Boosts Morale

When asked by a reporter about the effect upon morale of the successful Apollo IV mission, Seamans replied, "The morale of those involved in the Apollo Program following the accident we had last January was low. In a sense that everyone involved felt that there must have been something that he

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EARTH CRESCENT—Apollo IV's 70mm sequence camera clicked off a color frame every 11 seconds as the spacecraft went over the top of its 9769 nm apogee. The nightside terminator stretches north through Africa and Asia Minor. Above photo is looking southwest across the South Atlantic with a large low-pressure circulation lying north of Antarctica, which can be seen at lower left through breaks in the cloud cover. A portion of the Pacific Ocean can be seen at extreme lower left on the far side of Antarctica.

Apollo IV Textbook Mission

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A MOMENT RELIVED—Apollo IV Flight Director Glynn Lunney, left, and flight controllers in the Mission Operations Control Room watch a videotape replay of the launch on large-screen television projectors during the post-splash period.

or she could have done to have avoided the accident. We have to recognize when we have accidents that they are not acts of God; they are human mistakes, and in that particular case, after a very careful review we uncovered a large number of areas where we felt that we should and could make improvements . . . The group of people involved have moved ahead, I think, in a remarkable fashion following that accident. At times it has not been easy because of outside pressures and outside concerns about the capability of the team . . . I believe that the results today clearly demonstrate that this team of people made up of NASA, DOD, other government people, and of university research people truly have the competence to not only take on the manned lunar landing program, but any other

space objective that this country feels is important and to which we should dedicate our efforts."

MSC Director of Flight Operations Christopher C. Kraft, Jr. also had some praise for the ground support portion of the Apollo IV team. "I'm very proud of the team we had in the Control Center today, run by Glynn Lunney. Very proud of those boys; I think they did a wonderful job. The people at Goddard Space Flight Center are not represented here but I think that we ought to point out that today was a big day for them in bringing up the new Apollo network. It was quite a job to get that system ready for this flight."

1.4 Seconds Late

Planned liftoff time for Apollo IV was 6 am CST. Actual liftoff came at 1.4 seconds after 6, and subsequent mission events

followed generally within a few seconds of the planned times. (See Apollo IV Box Score for planned vs. actual event times.)

In spite of a telemetry indication that the S-IVB stage hydrogen tank propulsive vent valve was not responding to ground command to close prior to restart of the S-IVB's J-2 engine, a good restart was achieved at the end of the second revolution to drive Apollo IV toward its 9769 nm apogee over the Indian Ocean. The burn was approximately the same duration as will be required for lunar injection, but to absorb the excess energy and keep apogee to the desired altitude, the S-IVB/Apollo spacecraft was initially pitched down and yawed to introduce radial and out-of-plane components to the new orbital path.

Following separation of the Command and Service Modules

from the S-IVB stage, the service propulsion system engine was ignited for a brief burn to tune up the apogee. The new high-apogee earth-intersecting ellipse now had a perigee of 41 miles below sea level.

Earth Portraits

Across the top the Apollo IV apogee arc, an automatic 70mm sequence camera mounted in the command pilot's window made color photographs of the earth disc. But since the nightside terminator ran up through Africa and Asia Minor, only about one third of the earth was in daylight from Apollo IV's point of view.

The second SPS burn of five minutes just prior to separation of the command module from the service module served to drive the command module back into the atmosphere at lunar

return speed of more than 36,000 feet per second.

The command module's lift capability was used to split reentry heating into two pulses. Drogue and main parachutes functioned normally and the spacecraft was sighted from the deck of the prime recovery vessel USS *Bennington* at a ground elapsed time of 8 hrs 34 mins and at a range of about six miles. The landing point was some 18,500 yards west of the aiming point.

Swimmers were dropped from the *Bennington's* helicopters to attach the floatation collar and the spacecraft was hoisted aboard the ship in a routine manner. As a sort of bonus, the command module apex cover, jettisoned prior to chute deployment, was recovered by Navy swimmers.



Apollo IV Box Score

Event	Planned hrs:min:sec	Actual hrs:min:sec
Ignition	5:59:51.1 am CST	5:59:52.4 am CST
Liftoff	6:00:00 am CST	6:00:01.4 am CST
S-IC Inboard Engine Cutoff	00:02:15.5 GET	00:02:15 GET
S-IC Outboard Engine Cutoff	00:02:32.8	00:02:33
S-II Ignition	00:02:35.3	00:02:35
Jettison Launch Escape System	00:03:08.8	00:03:10
S-II Cutoff	00:08:36.8	00:08:40
S-IVB Ignition (1st burn)	00:08:41.3	00:08:45
S-IVB Cutoff	00:10:56.5	00:11:06
(Insertion into orbit with 99.3 nm perigee, 102.5 nm apogee)		
S-IVB Ignition (2nd burn)	03:11:33.5	03:11:27
S-IVB Cutoff	03:16:39.9	03:16:27
CSM/S-IVB Separation	03:26:40.1	03:26:27
SPS Ignition (1st burn)	03:28:16.8	03:28:06
SPS Cutoff	03:28:32.4	03:28:22
Reach Apogee	05:49:04.3	05:46:48
Apogee Altitude	9887 nm	9769 nm
SPS Ignition (2nd burn)	08:15:10.4	08:10:54
SPS Cutoff	08:19:34.4	08:15:25
CM/SM Separation	08:22:07.8	08:18:01
400,000 feet altitude	08:23:35.0	08:19:26
Enter Communications Blackout	08:23:57.0	08:19:51
Drogue Chutes Deploy	08:35:39.0	08:31:06
Main Chutes Deploy	08:36:27.0	08:31:48
Splashdown	08:41:25.0	08:36:54



SCORCHED BUT INTACT—Apollo IV command module is lowered onto a dolly on one of the carrier *Bennington's* elevators after landing less than six miles from the vessel. People aboard the carrier heard two sonic booms as the spacecraft entered the atmosphere to land 18,500 yards from the aiming point.

Cyclists to Hold Safety Program

The Space Center Cycles December 5 will hold a motorcycle safety program in the Webster Intermediate School auditorium at 7:30 pm to promote safe driving among motorcyclists—especially teenagers—and to inform motorcyclists of the new laws affecting motorcycling.

Members of the Texas Highway Patrol will show a film on safe driving and will review new state motorcycle safety laws. Parents whose children ride motorcycles or motorscooters are urged to see that their two-wheeled offspring attend the program. A question-and-answer period will follow.

Grumman Man Revives Child

A graduate of the life saving course conducted by the MSC Fire Department put his training to good use last week when he applied mouth-to-mouth resuscitation to three-year old James David Lunday after the child had ridden his tricycle into a Clear Lake City apartment swimming pool.

Grumman employee Frank Baerst responded to the screams of a woman who pulled the unconscious child from the pool. Baerst kept the boy alive until a physician arrived and oxygen was administered to induce normal breathing. Mrs. Frances Rabell, a nurse and wife of a Grumman employee, took turns with Baerst in applying resuscitation.

Luncheon Benefits White Center Fund

A luncheon style show December 7 at Sheraton King's Inn will benefit the Edward H. White II Memorial Youth Center Fund. A social hour will begin at 11:30 am followed by the luncheon and style show at 12:30. Style Show commentator will be Mrs. Edwin Aldrin.

Tickets at \$3.50 each are available from Mrs. Pat McDivitt 932-3730, Mrs. James Shaws 877-4703, Mrs. Jack Lousma 877-2160, Mrs. Carroll Bolender 877-1254, Mrs. Lee Samfield 488-4005, Mrs. George Low HU 2-7977 and at the Miramar Botique and Beauty Salon GR 4-2151.

Apollo Plans

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and Lunar Module, including crew transfer from the C&SM to the LM and rendezvous and docking.

These flights will be flown in the above order and as rapidly as all necessary preparations can be completed. As they proceed, all opportunities to accelerate progress toward manned flights and a rapid accumulation of manned experience with the Apollo/Saturn system will be sought.

The 1969 Apollo flight schedule calls for five manned Apollo/Saturn flights (AS 505 through AS 509) on the Saturn V space vehicle. Four of these flights, Apollo/Saturn 505 through 508, are programmed as lunar mission development flights or lunar mission simulations.

It is possible that the lunar landing could be made on the Apollo/Saturn 509 but it is also possible that it may be delayed until one of the remaining six Saturn V flights.

Endorsed by the Houston Jaycees and local police departments and civic groups, the program is open to anyone interested in motorcycling. For information on the program or on club activities call Bill Moore at 2291 or James Skipper at 2170.

Medics Speak At AMA Meet

Dr. Charles A. Berry, Director of MSC Medical Research and Operations, is chairman of the aerospace medicine panel of the 21st Clinical Convention of the American Medical Association on Wednesday, November 29.

Four MSC doctors are scheduled to take part in the panel "Complexity of Apparently Simple Problems in the Medical Support of Manned Spaceflight." The program is slated to begin at 9 am in Room A of the Astrohall, AMA convention headquarters.

MSC panelists and their subjects are:

Dr. Lawrence F. Dietlein, Chief Biomedical Research — "Selection of a Spacecraft Atmosphere."

Dr. Richard A. Boster, Biomedical Specialties Branch, "Providing a Urine Collection System."

Dr. George G. Armstrong, Chief of Space Physiology, "Determining the Metabolic Cost of Work in Space."

Dr. Walter W. Kenmerer, Jr., Chief of Biomedical Specialties Branch, "Protecting the Earth and Lunar Samples."

The aerospace panel is part of the four day AMA program November 26-29.



TANK APARTMENT—Artist's concept shows how a Saturn S-IVB stage will appear when converted to the Apollo Applications Orbital Workshop. Launched fully fueled with airlock and docking adapter attached, the S-IVB's liquid hydrogen tank becomes a shirtsleeve-environment workshop after the fuel has been depleted. At left is an Apollo command and service module launched separately and docked into one of the docking adapter's ports. The Apollo Telescope Mount is shown docked into one of the side ports. The ATM will be joined to the S-IVB after orbit is achieved. Solar cell "wings" to provide electric power fold outward from the S-IVB after orbit is achieved. McDonnell Douglas Corporation's Missile and Space Systems Division is making the S-IVB orbital workshop modifications under contract to NASA Marshall Space Flight Center and McDonnell Astronautics Company is developing the airlock under contract to MSC. (McDonnell Douglas photo)

Astrodynamics Meeting (Continued from page 1)

The December 12 afternoon session, Orbit Determination, will be chaired by J. C. McPherson, MSC. Papers are:

Free-Flight Analytic State Partialials for Error Propagation, R. T. Savely, MSC. *A Range-Difference Method for Computing the Doppler Observable*, H. G. deVezin, MSC. *Compensation for Modeling Errors in Orbit Determination Problems*, Dr. S. F. Schmidt, *Analytic Mechanics Associates*, Westbury, N.Y. *Onboard Rendezvous Navigation Using Sextant Observations*, T. J. Blucker, MSC. *Analytic Orbit Prediction*, D. S. Ingram, TRW Systems, Houston. *The Propagation of Position and Velocity Uncertainty Through Thrust Maneuvers*, S. Pines, *Analytic Associates*, and M. Oles, USAF.

Predicted Orbit Determination Accuracies for the Lunar Landing Mission Using MSFN Data, P. H. Mitchell, MSC.

ing session title. Chaired by E. C. Lineberry, MSC, session papers are:

Real-Time Rendezvous Maneuver Planning, R. R. Regelbrugge, MSC. *The Apollo Real-Time Guidance and Trajectory Control Program*, R. R. Ernull, MSC. *Formulation for the Apollo Real-Time Ground Navigation Program*, E. R. Schiesser, MSC. *Orbit Determination in a Real-Time Multiprogramming Environment*, S. L. Stanley, IBM, Houston. *Translunar Coast Midcourse Correction Procedures*, B. O. McCafferty, MSC. *Earth-Return Abort Targeting Logic for Real-Time Flight Control*, W. R. Lee, TRW Systems, Houston. *Real-Time Lunar Module Ascent and Descent Monitoring*, S. P. Mann, MSC.

The December 13 afternoon session will be chaired by M. P. Frank, MSC, and will have as a topic Mission Planning Analysis. Papers are:

Launch Abort Philosophy for Manned Spaceflights, C. T. Hyle, MSC. *Collision Probability of the Apollo Spacecraft with Objects in Earth Orbit*, E. M. Simpson and J. R. Duffett, TRW Systems, Cocoa Beach, Fla. *Gemini Rendezvous Braking Maneuver*, R. B. Jasinski and E. Mertz, IBM, Bethesda, Md. *Lunar Landing Site Selection Criteria*, E. J. Svreck, MSC. *Graphical Determination of Apollo Site Accessibility for Apollo and Apollo Applications*

Missions, P. A. Penzo, TRW Systems, Houston. *An Approach to the Solution of an Accurate and Economical Six Degree-of-Freedom Reentry Simulation Technique*, R. B. Hoffman, MSC, and J. J. Vaccaro, TRW Systems, Houston. *Reentry Trajectory Control for Apollo*, J. C. Adams and J. C. Harpold, MSC. *Mode Analysis for a Low-Energy Manned Mars Landing Mission*, J. J. Taylor and J. T. McNeely, MSC.

The final session on the morning of December 14, Guidance Techniques and Analysis, will be chaired by M. D. Cassetti, MSC. Papers are:

Onboard Determination of Iterative Guidance Target Parameters for the Apollo Mission Translunar Injection Burn, F. D. Cooper, TRW Systems, Houston. *A Polynomial Representation of Unique Characteristics of Lunar Trajectories*, J. B. Fariss and G. R. Sears, TRW Systems, Houston. *The GAHSP Program—A High-Speed Guidance Analysis Technique*, A. J. Bordano, MSC, and N. R. Burton, TRW Systems, Houston. *Design Principles of the Lunar Module Primary-Powered Flight Guidance and Control System*, G. W. Cherry, MIT, Cambridge, Mass. *A Manually Retargeted Automatic Descent and Landing System for the Lunar Module*, A. R. Klumpp, MIT, Cambridge, Mass. *The Lunar Module Abort Guidance System*, T. S. Bettwy and F. A. Evans, TRW Systems, Redondo Beach, Calif.

The Conference will be closed at 12:30 pm with remarks by Mayer and Bond. Optional tours of MSC are scheduled for conferees in the afternoon.

Fellowship Award



RECOGNITION—MSC Director of Medical Research and Operations Dr. Charles A. Berry, left, presents his executive assistant James E. Powers, Jr. with the National Institute of Public Affairs Fellowship Award. Powers last June completed a nine-month mid-career education program in public administration and political science at Stanford University on an Institute fellowship.

Texas frontier forts provided some measure of protection for lives and property during days of early statehood



Fort Phantom Hill

IN THE 1840's, the western reaches of Texas resounded, with rising intensity, to thundering hoofbeats of Indian mustangs on the Great Comanche War Trail.

This was more than a trail. It was a broad highway, well trampled for a hundred years by unshod hooves, and in some areas plainly visible as far as the eye could see. It extended a thousand miles or more, from Oklahoma through West Texas well into northern Mexico.

Seeking slaves and horses, fierce warriors came in a great red tide down this War Trail, sweeping southward from Indian Territory, skirting the fringes of the Staked Plains, gathering speed across Texas, and bursting at last with destructive fury against the gates of Durango and Saltillo.

The Comanches—those merciless Mongols of the West—often chose September, at a time of full moon, for their bloody raids. Across the frontier, September came to be known as the "Comanche Moon," and in Mexico it was a season of

terror. For the Mexicans were ill-equipped to defend against a savage foe that killed and burned at will, plundered whole countryside, and took captives northward each year into slavery.

It remained for the Treaty of Guadalupe-Hidalgo, at the end of the Mexican War, to point the way toward some workable solution of Mexico's problems with Indians from across the Rio Grande. By the terms of this treaty, the United States agreed to protect Mexico from American Indians.

In so agreeing, the United States Government added to its growing load of responsibility for controlling Indians. A few years earlier, it had assumed the task of protecting the Texas frontier when that Republic was annexed into the Union. Before Texas became a State, it had been the duty of every settler to guard his own scalp, with an occasional assist from the Texas Rangers.

Combined with a double duty to protect American citizens as well as those of a neighboring country, the United States soon

found itself confronted with still another facet of the growing Indian problem. Gold had been discovered in California in 1849, and the westward rush was on. Feverishly, work began on the tasks of establishing and safeguarding overland routes to California.

The First Line of Defense

Partly to live up to its treaty obligations, and partly to hasten the flow of westward expansion, the United States began to establish military posts at strategic points across the Texas frontier. Late in 1848, *Fort Martin Scott* was built about two miles out of Fredericksburg on the old road to San Antonio. San Antonio served as headquarters for all military operations, and from it a great many of the forts would receive their supplies.

Following Martin Scott in quick succession during 1849 came these forts, which collectively might be called the first line of frontier defense: *Fort Worth*, the forerunner of a great city; *Fort Croghan*, near present Burnet; *Fort Duncan*, on the

Rio Grande near Eagle Pass; *Fort Gates*, on the Leon River near present Gatesville; *Fort Graham*, on the Brazos River west of present Hillsboro; *Fort Inge*, on the Leona River in Uvalde County; and *Fort Lincoln*, on Seco Creek near present D'Hanis. *Fort Mason*, one of the most important posts allied by geography with this group, was built later in 1851.

At first, the efforts of the Army to make the frontier safe met with less than complete success. The area was new and wild; above all, it was big. The Army could ill spare enough troops to guard so vast a frontier. And even those who were assigned to Texas spent far more time with saw and hammer, building forts, than on the drill field, on the target range, or in the saddle. With so few troops patrolling so great a frontier, controlling Indians was like seining for minnows with a tennis net.

With few exceptions, forts in the first line of defense outlived their usefulness in a surprisingly short time. The frontier was a fluid, fast moving thing;

it changed quickly. As the wave of expansion swept on, there came a pressing need for more forts farther west. Fortunately, this need had been at least partly foreseen as early as 1849, when Capt. W. H. C. Whiting was sent on an inspection trip to West Texas.

Quite logically, Whiting reported the urgent need for more forts and heavier garrisons. He went beyond that, and recommended hitting the Indians where they lived, without waiting passively for them to come near forts. In this, he favored use of a powerful and mobile cavalry force which could range far and fast, instead of slow infantry.

A Second Line of Defense

Beginning about 1851, a new system of frontier forts was thrown up in Texas. Most of these had been established by 1856, but three important ones were not built until 1867. These posts constituted what might be called a second line of defense, though historians differ on terms assigned to groups of forts. The line extended from near present Jacksboro, in north-central Texas, to Brackettville, near the Rio Grande.

The forts in this line, many of which were to play vital parts in the winning and development of the West, include: *Fort Richardson* (1867), about half a mile south of present Jacksboro; *Fort Belknap* (1851), in Young County near present New Castle; *Fort Griffin* (1867), about 25 miles north of present Albany; *Camp Cooper* (1856), in Throckmorton County on the Clear Fork of the Brazos; *Fort Phantom Hill* (1851), about 14 miles north of present Abilene; *Fort Chadbourne* (1852), on Oak Creek in Coke County; *Fort Concho* (1867), at the junction of the North and Main Concho Rivers on the site of present San Angelo; *Fort McKavett* (1852), in Menard County; and *Fort Clark* (1852), on the Las Moras Springs near present Brackettville.

In addition to these, a third system of forts was formed farther west and along the border. Their purpose was partly to extend internal protection on the frontier; partly to serve as buffer protection along the Rio Grande. Among this group were *Fort Lancaster* (1855), in Crockett County on the old military road between San Antonio and El Paso; *Fort Stockton* (1859),



Ruins of Fort Griffin Officers' Quarters

at the crossing of the San Antonio Road with the Comanche Trail in Pecos County; *Fort Davis* (1854), in the Davis Mountains at the site of a primitive settlement once called Painted Comanche Camp; and *Fort Bliss* (1848), at El Paso.

Fort Davis troops were almost constantly at war with the Comanches and Apaches, and it was here that the colorful General Grierson made his headquarters during his famous Indian campaigns. Fort Bliss was of strategic importance because of its position astride historic old Paso del Norte.

Lee on the Frontier

To most Texans, that chapter of highest interest about the frontier forts is the one which outlines Robert E. Lee's life and experiences here.

Then a Lieutenant-Colonel in the Second Cavalry—just organized under command of Col. Albert Sidney Johnston and later to become one of the most famous cavalry regiments in the Army—Lee landed at Indianola on the Texas coast in March of 1856 and made his way by wagon train to San Antonio. He proceeded at once to Fort Mason, and went from there to Camp Cooper, where he took command.

It was Lee's first field command, and it marked the beginning of an entirely new life for him. He had served with distinction in the Mexican War and, more recently, as Superintendent of the U. S. Military Academy at West Point. He would make some drastic adjustments before he became acquainted with, and then accustomed to, the life of an officer on this wild and desolate frontier, where there were no luxuries and few comforts.

One of Lee's earliest chores in line of duty was to receive the Comanche chief, Katumseh, from the nearby reservation. One can only imagine the feelings of Lee, the polished and cultured gentleman-soldier, as he gave audience to the unwashed and unkempt savage who stood before him. Lee's description of that meeting reveals something of himself, as well as of the task he knew lay before him:

"We are in the Comanche Reserve with the Indian camps below us on the river, belonging to Catumseh's band, whom the Government is trying to humanize. It will be up hill work, I fear. Catumseh has been to see me and we have had a talk, very tedious on his part and very sententious on mine. I hailed him as a friend, as long as his conduct and that of his tribe deserved it, but would meet him as an enemy the first moment he failed to keep his word."

Lt. Col. Lee spent many weary months in 1856 at the relatively dull assignments of sitting on courts-martial. But if he found this duty distasteful, at least it gave him a chance to see the country, for his work took him along the border forts on the Rio Grande, back to Fort Mason, and down again to the supply depot at Indianola.

On these journeys, Lee grew better acquainted with Texas, better adjusted to its vastness,

more keenly attuned to its moods and its beauties, more understanding of its people and their problems. He took a vital interest in his surroundings, an interest that helped him win the long struggle against boredom. Most important of all, he learned to achieve an even greater mastery of himself. Some historians hold that it was Lee's stay in Texas that polished him to the final brilliance he would display in his superb leadership of the Army of Northern Virginia.

Late in 1857, after the death of his father-in-law, Lee returned to Virginia. By midsummer of the following year, he had restored order and solved problems that had stacked up at Arlington during his absence. In 1859 he was ordered to quell the John Brown disturbance at Harper's Ferry, and early in 1860 received orders to return to Texas. On his return to San Antonio, he took temporary command of the entire Eighth Military Department of Texas.

Lee spent his last year in Texas on some rather exciting projects—controlling the Mexican bandit, Juan N. Cortinas, who was terrorizing American settlements along the lower Rio Grande; keeping tabs on the interesting experiment with camels in Texas, to see if they might be substituted for Army mules; and directing an unrelenting campaign against Indians. He must have taken an uncle's interest in one patrol on which his nephew, Fitzhugh, overtook an Indian after a spirited chase and killed the savage in hand-to-hand combat.

Early in 1961, rumblings of approaching civil war were already heard on the Texas frontier. Secession was the topic of the day. Lee was more than troubled at this; the prospect of a holocaust that would set brother against brother was almost more than he could bear. Just before he left Texas on orders from General Winfield Scott, Lee was asked bluntly where he stood in case of war. He answered, after painful hesitation, that "... It may be necessary for me to carry a musket in defense of my native state, Virginia..."

In February, 1861, Lee left San Antonio for Washington. Soon after his arrival there, he was faced with the bitterest decision he would ever have to make. With great reluctance, he resigned from the Army of the United States.

The Indians

Strong, well-fed, and well-armed Indians made dangerous foes. But as they began to be stripped of buffalo which furnished their every need, some tribes became more docile, readier to yield to the white man's terms, readier to accept his largess in the way of food, clothing, and shelter. Late in 1850, at a council near the San Saba River, the United States negotiated a treaty with the Comanches, Caddos, Lipan-Apaches, Quapaws, Tawakonis, and Wacos. This was followed in 1851 by a second general treaty made at a council of leading tribes.

So it was, in the period between 1850 and 1860, that many Indians began to move to reservations set aside for that purpose in Texas. The largest of these consisted of about eight square leagues of land some 15 miles below Fort Belknap. When Col. J. K. F. Mansfield made an inspection tour of the area in 1856, he found groups from five friendly tribes making their homes on the reservation—Caddos, Anadarkos, Tonkawas, Wacos, and Tawakonis—more than 900 Indians in all.

The second reservation was one of four square leagues near Camp Cooper. About 500 Penateka Comanches, whom Mansfield called "friendly," lived there. Besides these, he reported that from 500 to 800 other Indians lived off reservations, being so "wild, inhuman, and thievish" that they were not yet "disposed to accept the protection of the government." Among these were some Comanches, Lipans, Tonkawas, and Mescalero Apaches. On or off the reservation, all Indians were treated as enemies unless they could show a letter from the Indian Agent.

A third reservation had been set aside to be located west of the Pecos River. This would cover an area of five square leagues for settlement of the far western tribes. Mansfield hoped for early settlement here, but in this he was to be disappointed.

In the final analysis, it was not the westward push of settlers or the carbines of blue-coated cavalymen that spelled doom for the Indian and his way of life. It was the buffalo hunter.

The buffalo was life itself to Indians. Its meat provided food. Its hide furnished clothing, shelter, and shields. Its bones were converted into useful tools and weapons. Even its blood and sinew were useful to Indian life. The Indian was a hunter, not a planter of crops and a tiller of fields. Without buffalo, he was lost.

To those who had ridden across early Texas for a hundred miles and more without seeing the end of a single and almost unbroken herd, it may have seemed preposterous to predict the passing of the buffalo. Yet even these mighty herds could not withstand the onslaughts of hunters who killed the great shaggy beasts as fast as they could reload their rifles. Hides fetched a dollar or two apiece, and hides flowed to market in a

steady stream. As that stream grew heavier, one could almost see the Indian's life-blood ebbing away.

Army Life on the Frontier

A hard and lonely life was the trooper's lot on the Texas frontier. And, in spite of Army regulations to the contrary, there was often a long time between payday.

Though many—officers and enlisted men alike—were veterans of the Mexican War, it was hard to get used to Army life in Texas. No one could quite acclimate himself to the burning Texas sky, the howling "northers" that could freeze a man where he stood, the long droughts followed by flash floods, and the searing winds that carried fine particles of sand ground to a razor's edge. Only night brought summertime relief, when the trooper on patrol laid his bedroll under the bright stars and was lulled to sleep by the owl's hoot and the coyote's cry.

Around the forts themselves, there was less action against Indians than Hollywood would have us believe. Troopers, in fact, found their daily lives filled with more construction than instruction. Many of their quarters were "wretched hovels not fit for occupancy." To remedy that, soldiers worked more with saw and hammer than with carbine and saber.

With families and loved ones far away, with slow and uncertain mails, with too few dashes after redskins to break the monotony, and with frequent shortages of food and water, tenseness and jangled nerves were no strangers to the frontier trooper. He might occasionally seek relief in hunting and fishing. But, generally, the most popular relaxation was no farther away than the bottles which beckoned from the nearest sutler's wagon—a sort of traveling variety store of that day.

For all his faults, the average trooper made a good soldier who knew how to take orders. And certainly he made a good fighting man. Lean and hard, he

could endure long hours in the saddle. His courage was unquestioned and reports of the day show surprisingly few desertions.

As for the officers themselves, it has been said that service on the Texas frontier was a kind of finishing school for men who rose to high rank on both sides during the War Between the States. In fact, Texas has been regarded as a sort of proving ground for general officers who chose either the Blue or the Gray.

The Forts Today

Much has happened in the past century to change the face and character of the forts which so valiantly guarded the Texas frontier.

Of some, like Camp Cooper, not a stick or a stone remains. Swept from the earth, they exist only in the pages of history, their brave tales recorded in archives and libraries; their sites honored by no more than a simple marker.

Others of more durable origin, like Chadbourne and McKavett and Phantom Hill, still raise their gaunt stone skeletons toward the Texas sky.

A few, like Concho and Belknap have been restored and preserved, to excite the imagination and fan patriotic fires in the hearts of later generations. One—Fort Bliss—is still an active military post. At least two—Brown and Ringgold on the Rio Grande—have been converted to the gentler purposes of education. Another—Fort Worth—was swallowed up and lost in the vortex of the great city which grew around it.

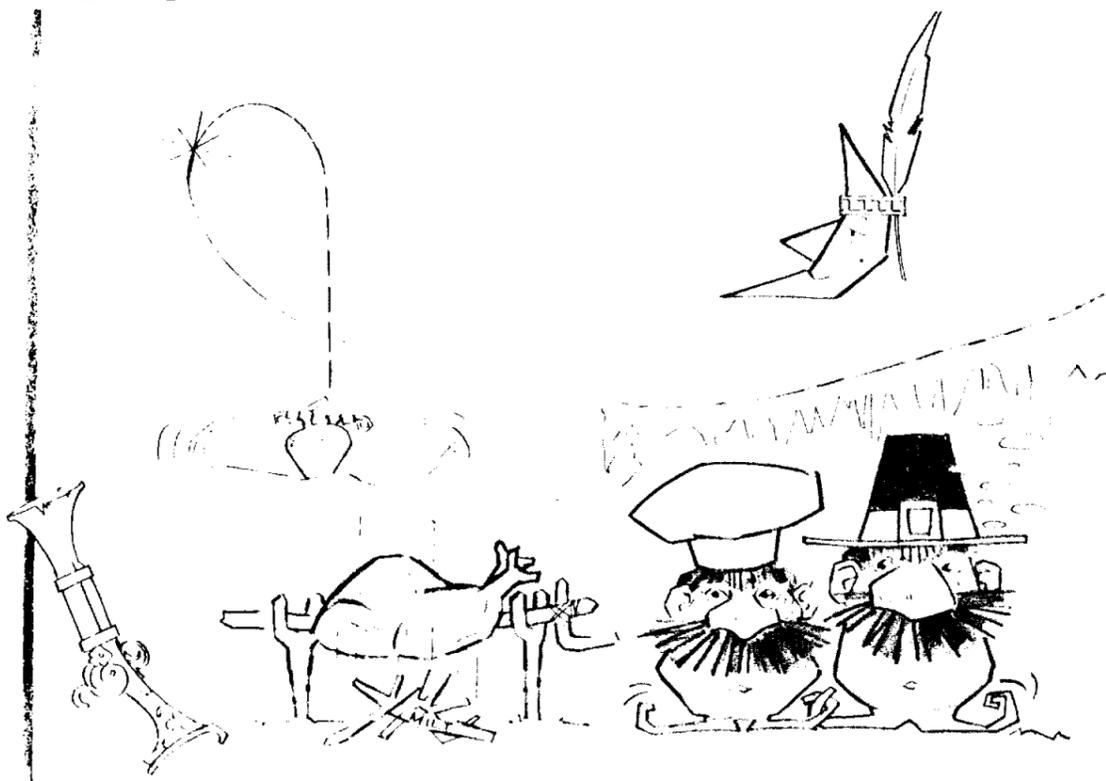
Today's Texan, as he visits the old forts, may experience feelings ranging from scholarly interest to a fierce and enduring pride in his homeland. Try as he will, he cannot help but thrill to the exploits of a time when the State was young and frontier families staked their fortunes and their very lives on the protection of these pioneer posts flung like watchful sentinels across the western face of Texas from the Red River to the Rio Grande.

The history of Texas from its earliest exploration through its colonization and growth into a republic, and finally as a state of the Union, is an extremely interesting history. Through the courtesy of Humble Oil and Refining Company, articles from Humble's *Texas Sketchbook* will appear in the *Roundup* during the next several months. The articles were written by F. T. Fields. Pencil sketches and watercolors accompanying the articles are by the noted Texas artist E. M. "Buck" Schiwetz. Many of the places described in the series are within weekend driving distance of MSC.



Ruins of Fort Chadbourne

Long fight with short stick . . .



Credit Union Straight Talk

By Paul Sturtevant

Now's the time (Christmas is here!) when all the "good guys" are offering to make it easy for you to open up a charge account for your Christmas buying. You know, "buy now—pay later". Nothing, but nothing is said about what it is going to cost you for revolving merry-go-rounds, lay away charges, and all the bits and pieces that eat up your money! The whole point is the *interest rate* and the *total charge*. Why pay higher interest rates than those charged by your credit union? Don't forget . . . your credit union exists to help you. If you need money for Xmas or other reasons, come see us. You can *save* money by borrowing from us! No hidden charges, just *straight talk*, that's us!

For your convenience, "Roundtrippers" (mailing envelopes) are available for deposits

IEEE to Hear Traffic Expert

William Longmuir of Crouse-Hinds Company will be the featured speaker at the November 30 meeting of the Institute of Electrical and Electronic Engineers. His topic will be "The Technology of Traffic Control vs. the Increase in Automobile Traffic," in which he will discuss design and application of traffic control systems such as closed-circuit TV, computers and traffic load sensing.

The meeting begins with a fellowship hour at 6 pm and dinner at 7 (\$3.75/person). The meeting will be in the Houston Engineering Society Building, 2615 Fannin.

For reservations call Stig Ekeroot at 4941 or S. Gaudiano at 2297.

Flu Shots Given

MSC and contractor employees who missed getting influenza immunizations last week may get them December 1 in the Bldg 8 Dispensary lobby from 1 to 4 pm. Bring Social Security cards.

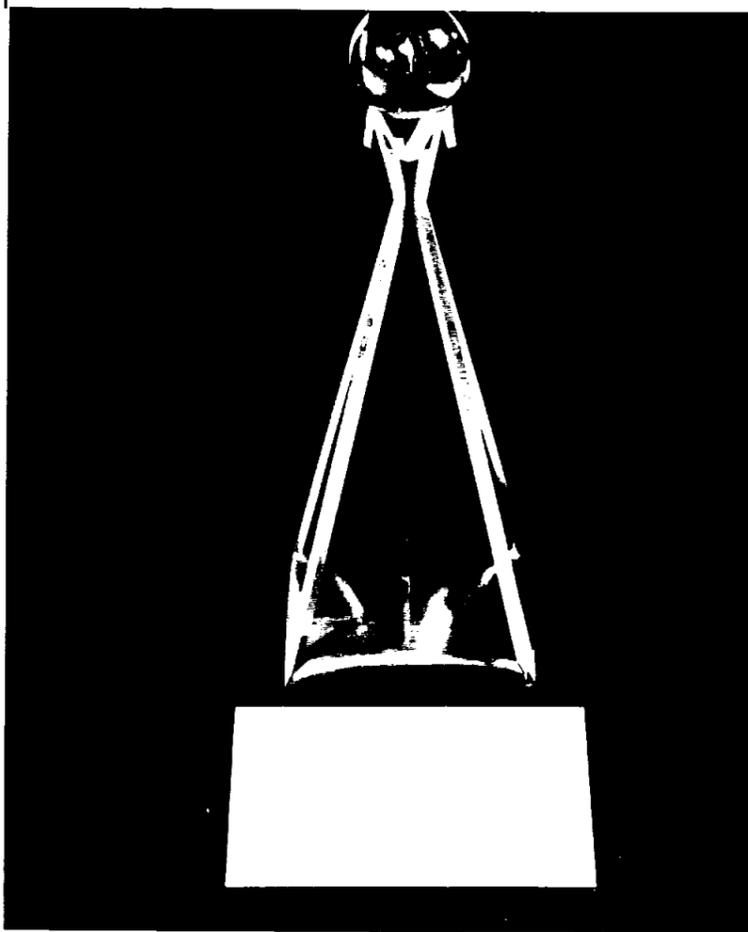
LM-1 Goes to Pad

Lunar Module 1, scheduled to fly early next year in an unmanned earth-orbit mission, Monday was mated to its Up-rated Saturn 1 launch vehicle at Kennedy Space Center Launch Complex 37. Electrical Testing began Tuesday.

The *Roundup* is an official publication of the National Aeronautics and Space Administration Manned Spacecraft Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for MSC employees.

Director Dr. Robert R. Gilruth
Public Affairs Officer Paul Haney
Editor Terry White
Staff Photographer A. "Pat" Patnesky

Omega and Alpha



SHARED RECOGNITION—MSC employees received the Golden Omega award at the seventh annual Electrical Insulation Conference in Chicago October 16 "in grateful recognition of their outstanding contributions to space technology and knowledge." Accepted in behalf of MSC by Director of Engineering and Development Maxime A. Faget, the award will be displayed in each major organizational area of the center before being placed on permanent display in the lobby of Bldg 2's ninth floor.

Kids Christmas Party Scheduled December 16

The EAA-sponsored MSC Childrens Christmas Party will be held December 16 from 1 to 3 pm, beginning with the arrival from somewhere north of here of Mr. and Mrs. S. Claus at the Auditorium. The Clauses will

conduct individual counseling sessions with each child to determine his unsuppressed desires regarding what he expects to discover under the tree on the morning of the twenty-fifth.

A cartoon film "Santa in Animal Land" and TV cat-girl Kiti-rik will further elicit fantacizing by the moppets.

Moving to the main cafeteria, the party will end with distribution of gifts and serving of refreshments.

Children from 2 to 12 are invited. One parent may accompany a child under 5; all others should leave their children at the auditorium and pick them up at the cafeteria.

Tickets at \$.50 each are available from Peggy Chambers, Bldg 16, Room 248, Ext 2403 or from EAA representatives. Additional party information may be got from chairman Helen Ragsdale at 3885.

Browsers' and Buyers' Corner



SPACE SHOPPE—Space-theme jewelry, tie clasp-cufflink sets and other doodads handled by the MSC Exchange Store in the main cafeteria may offer the answer to some Christmas shopping problems. The store was opened a year ago and over the months has expanded its merchandise to include a selection of space science books as well as souvenir items. Minding the store, left to right, are assistant manager Virginia Carpenter, manager Mary Kotanchik and clerk Diana Bailey. The Exchange Store is open from 8:30 am to 2 pm Monday through Friday and from noon to 5 pm Sundays.

Theater Party Opens Series

Holders of Theater Party discount tickets are reminded that the first entertainment event in the series, a performance by Jose Molina's Spanish ballet of "Capriccio," will have an 8:30 pm curtain time Wednesday at the Jones Hall of Performing Arts.

Roundup Swap-Shop

(Deadline for classified ads is the Friday preceding Roundup publication date. Ads received after the deadline will be run in the next following issue. Send ads in writing to Roundup Editor, AP3. Ads will not be repeated unless requested. Use name and home telephone number.)

FOR SALE/RENT—REAL ESTATE

In Webster 3 bedrm brick, 1 1/2 baths, garage, 1 1/2 acres, fruit, berries, Bay Area Blvd., \$27,500 or best reasonable offer, J. J. Busby, 932-4845.

For Rent: 4 Bdrm, 2 baths, home in El Lago, MSC area. W. J. Kapryan, PA 9-2281 or Indiatlantic, Fla. 305/727-1813.

Most ideal location in Clear Lake City. Very large Oakbrook 3-2-2 and screened-in Lanai. One block from school and golf. Custom drapes and carpet. 6% conventional loan, \$4200 equity, total \$27,300. Joel Rosenzweig, HU 8-1085.

FOR SALE—AUTOS

67 Corvette Coupe, 427 engine, 3 dual carbs, FM, air, pwr steer, 4-speed close-ratio trans, 3.70 rearend, 10,000 mi., P. R. Charlton, 944-0208.

64 Cadillac Fleetwood, original owner. D. J. Hudson, 591-2168.

61 Austin-Healey, 3000 Deluxe, good running condition, wire wheels, overdrive, three attachable tops, needs paint. Christine Perriera, HU 8-2529.

Must sell 64 red MG-B wire wheels, overdrive, \$1200, all reasonable offers considered. Dick Beaudry, GR 3-4958.

55 Olds, 4 Dr sedan, excellent condition, heater, A/C new engine, new battery and 4 new tires. James R. Bailey, 946-0905.

59 Triumph TR3, new tires & black paint, extra clean, runs very good, radio & heater, Tonneau cover, boat, and good top. \$650 or make offer. Clayton Pollard, HU 7-0024.

67 Corvette convertible, 427 engine, 4-speed, air, AM-FM, 6,200 miles, E. A. Cernan, 591-2383.

65 Bug (VW) named "Shultz," red (like new) paint job, sunroof, radio, good cheap transportation, knows Houston like back of its steering wheel, must sell to good person because wife feels we are losing a member of family. \$1050. Bob Brown, HU 8-0649.

56 Oldsmobile, runs very good, \$175, S. A. Roosa, HU 3-2321.

67 Tempest Sprint, air, tinted glass, power steering, floor shift, radio, rally wheels, W.W., low mileage, \$2350, Jim Cooper, 591-2723, 5 to 7 p.m.

AMCO grill guard, fits MGA. \$7. Bob Bird, HU 2-7960.

63 Rambler 770 station wagon, automatic, air, good condition, \$975. Ted Sampsel, GR 1-0172.

FOR SALE—MISCELLANEOUS

Lowrey transistorized electric organ-2 manual, full pedal board, Leslie speaker, many extras, including bench. Walnut finish, 2 yrs old, like new. Cost \$1450. Will sell for \$900. Can be financed at \$24/mo. James C. Weaver, 932-2371.

25-in 1959 table model Zenith TV, B&W, good condition. 12 by 14 ft cotton beige carpet, excellent condition, Mrs. Edward H. White, 877-2231.

New Firestone 6.70-15 4-ply nylon white-wall tire. J. Whiteley, 946-3804 after 6.

Nice dresser, night stand and lamp, good condition. J. Whiteley, 946-3804 after 6.

Nikon f/3.5 135mm telephoto lens. Brand new in Nikon box with lens cap & plastic case. Will fit Nikon F or Nikkorex F. List price \$169.50. Sell for \$95. Bruce H. Walton, 591-2329, Nassau Bay.

Harmon-Kardon 50 watt stereo amplifier control center. Award series model. All inputs, includes third channel output etc. Recently tolerance checked. Sacrifice \$80. Jon Farbman, WA 6-7192, late nights.

Navy RBC receiver and power supply 2-18MC, \$50; Navy shipboard radio operators desk, \$25; 12 volt DC power supply and battery charger, \$15. Ken Jones, GR 1-3760.

64 Sears Sports Motorcycle. Excellent condition, extremely low mileage. \$150. Fox, Nassau Bay, 591-4460.

Viking Ranger transmitter 160m-10m, 100 watts AM. Transmitter is in mint condition. \$125. Fox, Nassau Bay 591-4460.

Sorrel mare, bred to Arabian stud, and her five month old filly sired by same. Will sell together or separate at bargain price. John S. Hyams, 489-8291.

65 Mustang, 2 plus 2 fastback, 289 hp, auto trans, air cond. GTO package, pwr brakes and steering, rally pack, like new firestone super sports, low mileage, one owner. \$1495. Don Heywood, Dickinson, 534-3979.

63 Dodge 440 wagon, needs body work air cond, auto trans, 383 V8 with automatic, low mileage, good condition, complete \$185. Don Heywood, Dickinson 534-3979.

56 Chev, 2 Dr. sedan, 6 cylinder engine, in good condition, body fair condition. \$150. L. G. Kaigler, 877-4731.

12 ft. plywood runabout, stripped for fiberglassing. Trailer included, \$50; 18 hp Johnson outboard motor, \$100. Also will consider trade for 5 hp to 7.5 hp outboard motor or for a 12-Ga shotgun, A. D. Aldrich, Friendswood, 482-7384.

AKC Beagle, 6 months old, female. \$20. Mary Dunn, GR 9-1295 after 4:30 p.m.

Girl's twin size "Princess" (bonnet) bed, complete with box springs & mattress. Antique white with gold, see to appreciate, \$100. L. Shirley, 534-4098, Dickinson.

Trundle bed, Simon's Beauty Rest mattresses like new, sleeps two, bargain, \$85. L. Shirley, 534-4098, Dickinson.

Thomas electric organ, Westinghouse washer and dryer, 8' portable formica covered bar, portable electric fan, will accept reasonable offers. Gordon L. Hughton, 534-5678 weekends and after 5 pm.

17 1/2 ft. Dorest fiberglass Boat; vinyl top; side curtains; 90 hp Evinrude Selectomatic motor; Little Dude galvanized big wheel trailer with electric winch. \$1,500. John W. Engle, HU 6-3574.

Christmas puppies. Snow white German Shepherd puppies. Excellent bloodline. AKC, wormed, shots, will make good family companions and guard dogs. Males \$100, females \$75. Phonicille De Vore, Alvin OL 8-6227 after 5 pm.

CB Radio, Olson 3 spotter. 110 V AC or 12 V DC. Receives all 23 channels, transmits on 12. 2 transmit crystals included. \$55. Bob Bird, HU 2-7960.

Set of bar-bells, \$20. Ray Johnson, 944-7020.

11 x 14 ft. beige cotton rug with pad, Mrs. A. C. Bond, 877-4103.

Six piece mahogany traditional bedroom suite, 877-2323.

Dishwasher, 1963 Mobile Maid, 877-2867.

21 ft. boat for sale. Lone Star cabin has SS radio, head, lights, 80 hp-Merc. OB. \$1350, and will consider any trade item. Ron Smith, PA 3-0880 mornings or at 944-1292 after 5:30 pm.

Kenmore automatic ironer. Good condition. Swap for small outboard motor. Bob Bird, HU 2-7960.

Swiss made Bernina sewing machine without cabinet in very good condition. \$20. Bill Gatlin, 932-3969, League City.

Want to trade 1964 Zenith B&W TV, mahogany console for 1965 portable TV, 17" or larger. C. R. Scarlett, 932-3778.

Kenmore washer, regular and delicate cycles, in good condition. Thompson, HU 6-7768.

Baby crib. James B. Irwin, 591-2640.

Thoroughbred, half breed, beautiful boxer pups. \$10 ea. J. Rodman, 932-2897.

Range, Kitchen, Hardwick, full width, large oven and broiler. Full size griddle in center of top. Excl. condition. \$30. J. Rodman, 932-2897.

Miniature Schnauzer dog, 5 years old, female spayed. AKC registered. J. Hess, 877-2405 (Kemah), after 5 p.m.

Spinnet piano, very good condition. Sofa-bed, 72", brown, \$20. Table tennis table and accessories, \$25. J. Hess, 877-2405 (Kemah), after 5 p.m.

King size firm mattress, box spring, and Hollywood frame for sale. H. Huntoon, after 6 p.m., MI 5-3673.

Canoe hull 18 ft. wood, needs work. Must sell immediately; best offer. Frank Boyle, Dickinson 534-5695.

English Pointers, AKC reg. Top show and field stock, liver and white pups. \$75 and up. Rita Heywood, Dickinson 534-3979.

Bundy tenor saxophone and carry case cost over \$400 one year ago—will sell for \$225. Bruce Permenter, Webster 932-5581.

Sky kennel like new, large dog, collapsible. \$12.50. Dr. Johnston, HU 8-4112.

10 cu. ft. chest freezer, Signature (Montgomery Ward), good condition, \$50. Beatty, HU 2-7938.

Reed & Barton silver, Marlborough pattern, 32 pieces (6 ea. dinner forks and knives, 16 misc. pieces, 4 serving pieces). Retail value \$400. Will take \$200 cash. Verby, 946-3907.

WANTED

Ride wanted for daughter from Clear Lake City to University of Houston, starting January 5. L. Hammer, HU 3-3821.

Quiet couple need small furnished house or apartment for a couple of months. Call 877-4418.

Portable electric sabre saw. Charles Clarke, 877-2426.

Under the Money Tree



CASH CENTRAL—MSC Credit Union employees take time out from their bookkeeping to pose in their new quarters in the Bldg 11 Cafeteria. Seated, left to right, are Patricia LeFlore, Oneda Nichols and Kayo Rihn. In window: Margaret Matthews, Peggy Ray, Becky Ewers and Helen Hensley.

EAA Club Register

Club	Contact	Meeting Time/Place
Astronomical Society	Clark Neily x 5349	As announced
Barber Shop Quartet	Bill Drews x 4386	As announced
Bowhunter's	John M. Trebes x 4916	As announced
Bridge	John Herrmann x 3551	Each Tuesday, 8:15 pm Bldg. 336. EAFB
Charm	Dorothy Newberry x 2738	As announced
Flying	Don Bray x 4131	2nd Tues. each month NG Bldg. 6
Golf	John Jones x 2231	As announced
Judo	M. H. Von Ehrenfried x 2337	1st Tues. each month. 5 pm Room 258. Bldg. 4
Organ Club	Vernon Powell x 4141	As announced
Radio Control Airplane	Bill McCarty x 5393	3rd Wed. each month 7:30 PM
Sailing	Jerry Grayson x 5271	As announced
Scuba Diving	Fred Toole x 2021	1st and 3rd Wed. each month 6 pm Kings Inn
Spanish	Jose R. Perez x 5431	
Singleton	Arminta Yanez x 7771	
Toastmasters	Dick Crane x 4313	

Other clubs in the process of organization are:

Motorcycle	Jack Joerns x 4171—Bill Moore x 2291
Sports Car Club	Rod Bass x 4422
Folk Dance Club	Max Krehnak x 3907

Rifle Club Seeks Junior Members

MSC and contractor employees with youngsters between 11 and 19 may be interested in the activities of the Clear Lake Junior Rifle Club.

Formed last June, the club now has a membership of 80 juniors and 40 adults. Members shoot each weekend at the club's six-acre range on Bay Area Boulevard at Horsepen Bayou.

Rifle marksmanship, shotgun shooting (skeet and trap) and all aspects of safe gun handling are taught by the club's 20 NRA-certified instructors. All new members are required to attend safety and marksmanship classes before they fire live ammo on the range.

The club is affiliated with the National Rifle Association and the Civilian Marksmanship Program. For membership information, call club director Gene Allen at HU 8-4075, secretary Pat Suddath at HU 8-1076 or treasurer Anne Williams at HU 8-2182.

JOIN THE STAR-SPANGLED FREEDOM PLAN

SIGN UP FOR U.S. SAVINGS BONDS/FREEDOM SHARES

EAA Sponsors Christmas Dance December 16

The MSC Employee Activities Association December 16 will sponsor the semi-formal annual Christmas dance in the Emerald Room of the Shamrock-Hilton Hotel.

Dick Kruger and his Society Orchestra will provide dancing music. Included in the \$3 per person ticket price are set-ups, dancing from 9 pm to 1 am and breakfast.

Only 750 tickets will be sold on a first-come first-served basis by Mary Sylvia at 3958 and Claude Ingels at 5891.

MSC Deer Photo Draws Plum Brook Director Offer

November 14, 1967

TO: Public Affairs Office, AP
Attention: Roundup Editor

FROM: Director, NASA Plum Brook Station

SUBJECT: Article in "Roundup"

We at Plum Brook Station noted with interest the picture of the white tailed deer on the front of "Roundup" for November 10, 1967 (Vol. 7, No. 2). Since there appears to be only a small number remaining in your herd we hasten to offer any reasonable number from our ever increasing supply. We can furnish any number up to 400. Capture and transportation would have to be the responsibility of the Manned Spacecraft Center although some expertise in these matters currently is available at the Station.

We would caution that only reasonable numbers be transferred (no SF-52 required) since our own experience indicates that with protective range and adequate food supply the population tends to increase geometrically.

If you have any interest in this transfer please let us know since we are working actively with the state and national wildlife authorities to keep the number of deer at Plum Brook Station within bounds.

Sincerely yours,

Alan D. Johnson

1967 MSC/EAFB Flag Football League

Final Standings

TEAM	Won	Lost	Pct	TEAM	Won	Lost	Pct
CAD	11	0	1.000	747th	4	5	.444
MPAD	10	1	.909	SMD	3	8	.273
TANG	8	3	.727	Coast Guard	2	7	.223
Packers	8	3	.727	LRD	2	8	.200
2578th	6	4	.600	Bandits	2	9	.182
FCD	6	4	.600	Rats	0	10	.000

Second Manned Apollo Flight Crew Announced

NASA Monday named flight crews for the second and third manned Apollo missions.

The first manned Apollo mission is on an uprated Saturn I. The second manned mission is scheduled as the last of six Apollo flights in 1968 and will be the first manned launch of a Saturn V launch vehicle. The mission will provide the first manned operation in space with the command, service and lunar modules, including crew transfer

from the command module to the lunar module, and rendezvous and docking.

Prime crew for the second mission is James A. McDivitt, commander, and David R. Scott, command module pilot, and Russell L. Schweickart, lunar module pilot. Backup crew is Charles Conrad, Jr., commander, Richard F. Gordon, CM pilot, and Alan L. Bean, LM pilot.

Prime crew for the third mission is Frank Borman, commander, Michael Collins, CM pilot, and William A. Anders, LM pilot. Backup crew of Neil A. Armstrong, commander, James A. Lovell, CM pilot, and Edwin E. Aldrin, LM pilot.

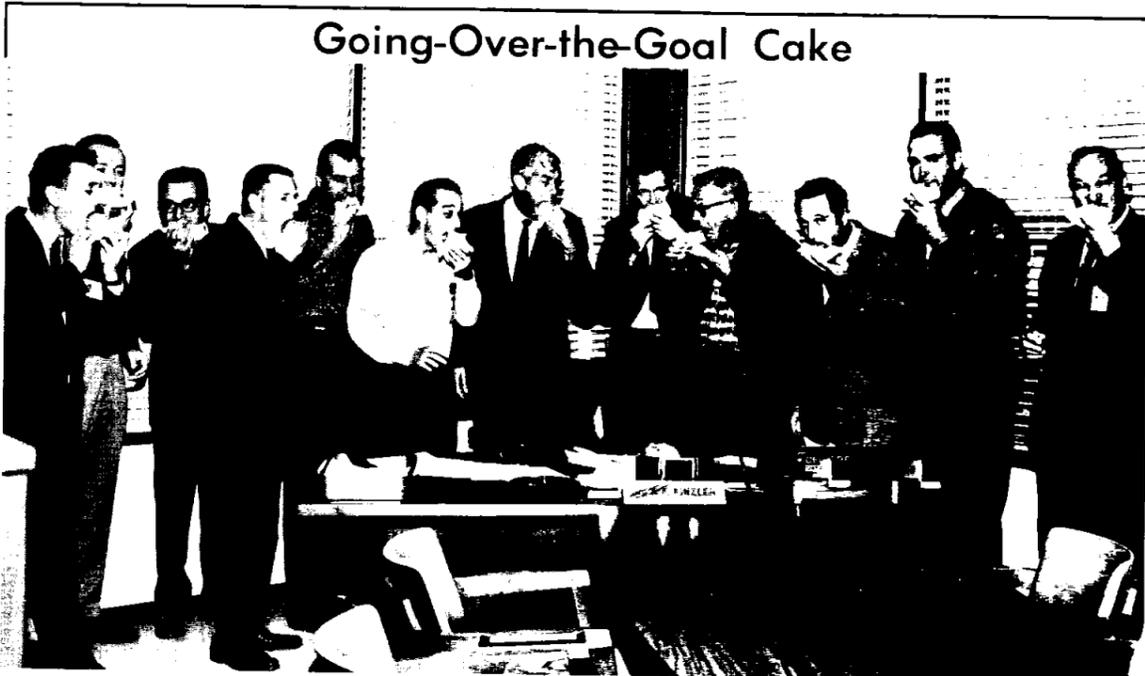
Plans call for the third manned mission to be launched in early 1969. It will be an earth orbit flight simulation of the lunar landing mission. The orbit will have a 4,000 mile apogee. Events of the lunar mission will be conducted in the same sequence and at the same relative times during this mission. Mission plans also call for a maximum distance rendezvous with the LM rendezvousing with the CSM from a distance of several hundred miles.

Johnston Speaks To ISA Meeting

H. R. Johnston of Bonner & Moore Associates will speak at the November 29 meeting of the Apollo Section, Instrument Society of America.

Johnston will outline the potentials of using the computer to adapt the teaching process to the needs of the individual student, and applications which could be used in either the industrial or educational fields.

The meeting will begin at 6:15 pm at the Holiday Inn on NASA Road 1. Non-ISA members are welcome. For reservations, call HU 8-0900.



Going-Over-the-Goal Cake

SWEETTOOTH SESSION—Employees of Technical Services Division take time out for a bite of cake noting their going over the top in the Division's United Fund drive goal. TSD achieved 102% of its goal with a 92% participation. Cake eaters, left to right, are Thomas S. Hunter, Joe J. Elliott, Jesse W. Hogan, Richard E. Stanton, Charles J. Gardner, David L. Starkey, Division chief Jack A. Kinzler, Andrew F. Andries, James W. Bailey, James E. Hebert, Bill Lane Johnson and Peter P. Smetek, Sr.

Pecan Crop Light

Sparse rainfall in the spring has caused MSC's grove of pecan trees to produce such a small crop that the Employee Activities Association will not conduct a pecan harvest day this year.

Biosatellite II Shows Zero-g Effect on Plants

Data photos taken in orbit aboard Biosatellite II and released early this month show pronounced disorientation of the leaves and stems of four pepper plants.

The photos appear to demonstrate that plants depend on gravity for their orientation.

The launch last September 7 and recovery from space two days later of Biosatellite II was the first time a broad-leaf plant had grown in the absence of gravity.

Four "Yolo Wonder" pepper plants, known to resist bending in simulated weightlessness, were photographed every 10 minutes (268 times) in 30 orbits, or 45 hours of weightless flight. The photos show that the leaves failed to grow in the normal horizontal position and the stems did not hold to the vertical position, even with supporting brackets.

The National Aeronautics and Space Administration's Biosatellite project is managed by the Ames Research Center, Mountain View, Calif.

Photos recovered after flight

show that five hours of zero gravity apparently caused the leaves of one plant to bend noticeably from their horizontal position. After 12 weightless hours, the leaves were down almost 90 degrees, and after 18 hours they were touching the stem. Several of the nine plants flown (five were not photographed) were still in this condition when delivered to Dr. Samuel Johnson, the principal investigator, North American Rockwell Corp., at the Biosatellite laboratories in Hawaii.

The pepper plant experiment shows that plant leaves and stems depend for orientation on continuous gravity, applying a force in a direction parallel with the plant stem. This gravity effect is taken for granted on Earth.

Many scientists believe plant orientation to the Earth's gravity results from distribution of growth hormone within the plants. When gravity ceases to signal the normal distribution of the hormone in the plant, the hormone appears to change its site of activity.

Spanish Club Plans Grammar Classes

Members of the MSC Spanish Club November 13 saw a movie on Mexico City, Yucatan and Guatemala and began plans for an advanced Spanish grammar course. The proposed course would be a continuation of the recently completed Spanish conversation classes.

The proposed classes will be discussed further at the club's next meeting Monday at 5:15 pm in Room 108 Bldg 13. Club president Jose R. Perez will give a slide-illustrated talk on some of Mexico's historical and archaeological background. Non members are welcome to attend the meeting.

Todos son bienvenidos a nuestras juntas.

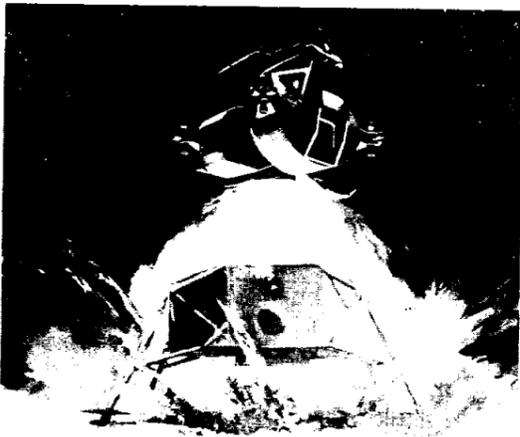


Calbraith P. Rodgers, a ranging motorcycle racer with only 60 hours of flying experience, took off from New York in a Wright biplane named Vin Fiz. His destination: Pasadena, California. During his halting westward journey, Rodgers experienced 19 crashes. His frail craft was repaired so many times that at trail's end only the rudder and a single strut of the original frame remained. Rodger's unprecedented trip was punctuated with 69 stops, many of which were unscheduled. After 49 days, the cigar-smoking aviator reached his goal--with one leg in a cast.

SEPTEMBER 17, 1911

Thus marked the end of the first U. S. transcontinental air flight.

By comparison, Apollo's mission may seem unspectacular. With only two landings in half a million miles, it may even seem routine. We hope so. Yet the sweet smell of success tomorrow depends upon each of us today--and how well we do our jobs--till the crews come home.



KEEP **NASA** THE SYMBOL OF EXCELLENCE
MANNED FLIGHT AWARENESS
APOLLO

